TIMBER WINDOWS & DOORS
ALLAN BROTHERS

High Performance Timber Products

Vertical Slide & Tilt - Technical Guide

Version 1.1

December 2011

ALLAN BROTHERS LTD
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Supporting information - Please read in conjunction with General Technical Information

Product Description

About the Slide and Tilt

Slide and Tilt

The Slide and Tilt window range is a vertical sliding sash window utilising spiral balances. The sashes also tilt inwards for cleaning purposes. This combination gives the Slide and Tilt window a more traditional appearance externally which is perfect for renovations and new build alike plus the advantage that they are safe and easy to clean from inside the building unlike the more traditional vertical sliders. The range utilises a 28mm Double Glazing Unit which gives the client a wide variety of glazing options. Whether for security, noise or thermal insulation we can provide a glazing solution to suit the specific requirements.

Sloping surfaces, curved edges and even the angle at which fixings penetrate the timber have all been considered in the design package to bring you this quality window. Exacting standards of timber specification combined with careful inspection on delivery ensures that the timber we use is of the highest standard. This is maintained through careful control of humidity within the manufacturing process.

Company and Window Accreditation

ISO 9001: 2008 Quality System

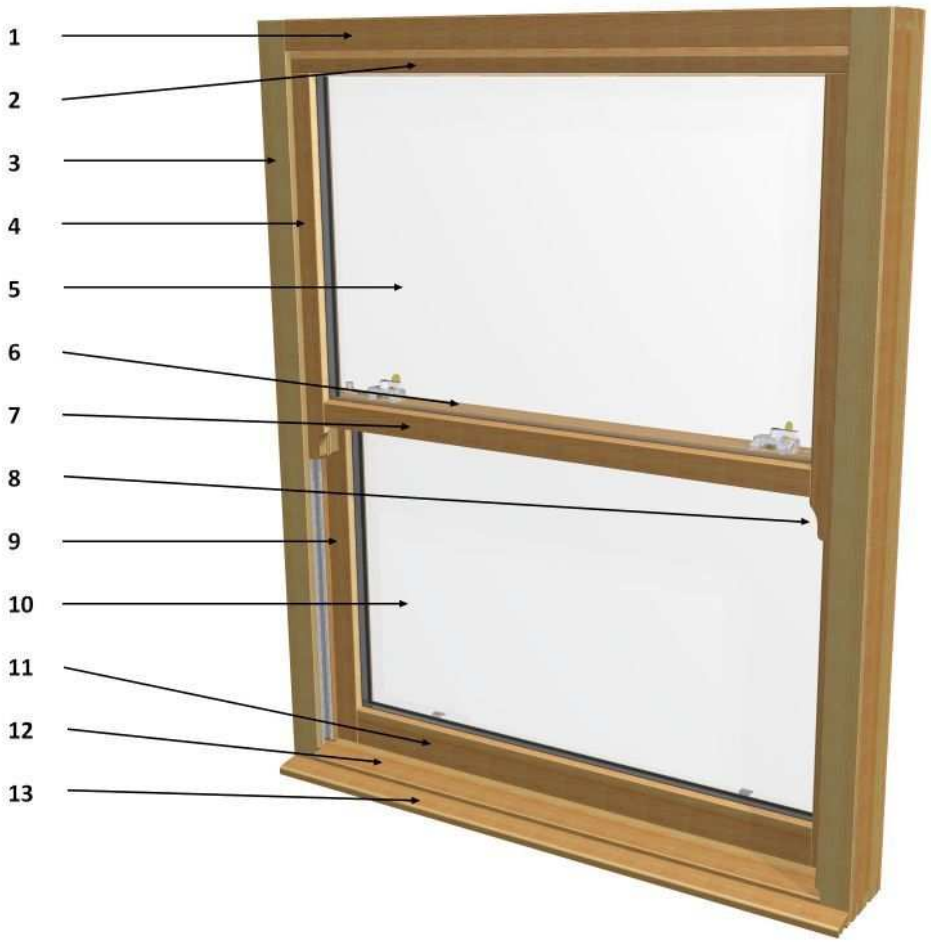
BS644 :Q Mark for Timber Windows

BS7950: Q Mark for Enhanced Security Windows

Secured By Design License Holder

FSC Chain of Custody for Redwood Timber

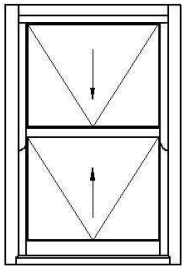
Product Terminology



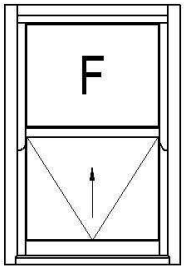
Detail of Top Sash Horn

1. Frame Head
2. Sash Top Rail
3. Frame Jamb
4. Top Sash Stile
5. Top Sash Glazing Unit
6. Bottom Sash Meeting Rail
7. Top Sash Meeting Rail
8. Top Sash Horn (option of no horns)
9. Bottom Sash Stile
10. Bottom Sash Glazing Unit
11. Bottom Sash Bottom Rail
12. Frame Sole
13. Cill Extension

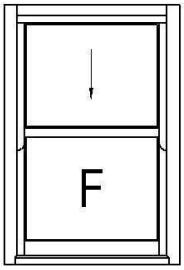
Elevations



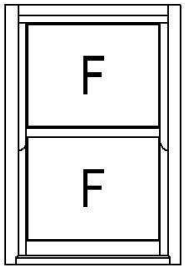
Both Sashes Sliding with Tilt facility



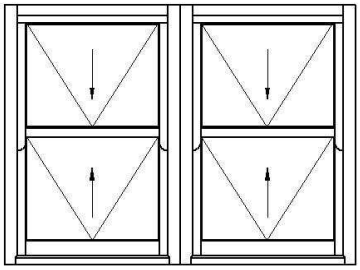
Fixed Top Sash - Bottom Sash Sliding with Tilt facility



Top Sash Sliding - Bottom Sash Fixed (Note: No Tilt facility available on top sash)



Both Sashes Fixed

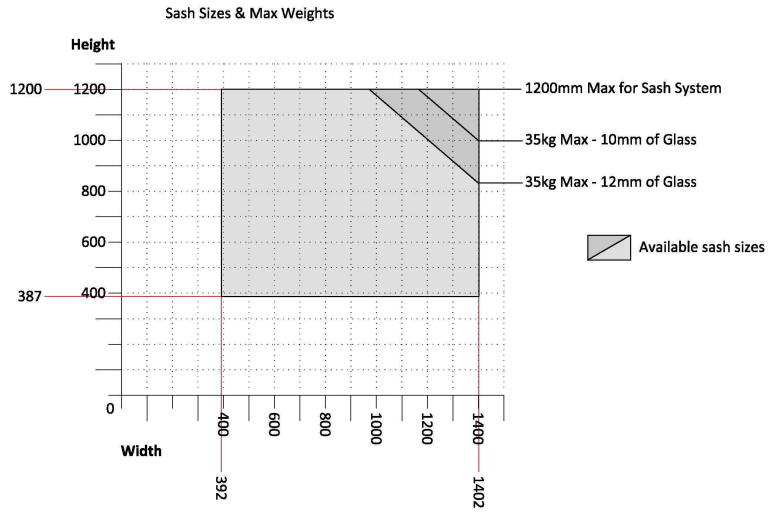


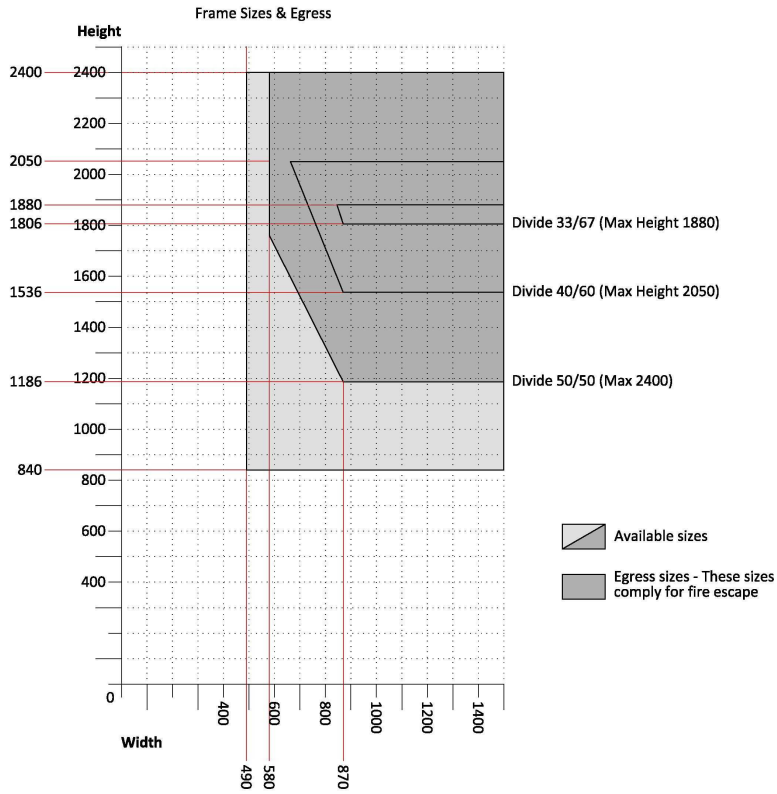
Windows can be coupled to suit various other elevations

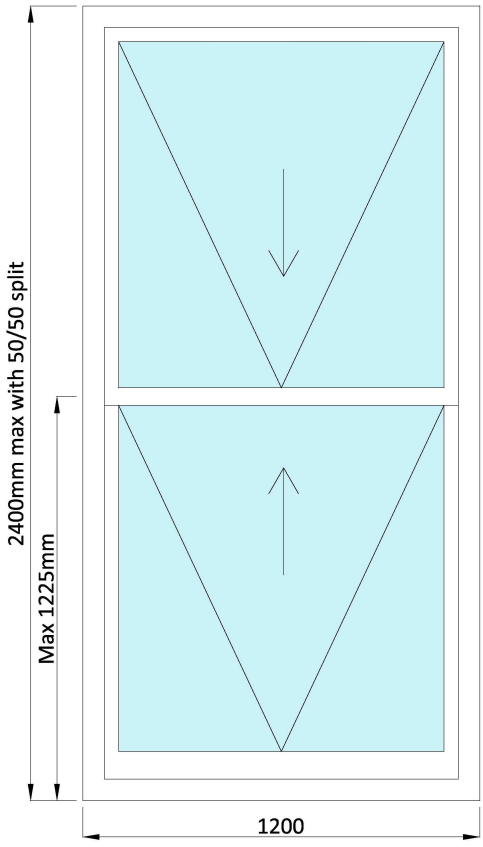
Please note all items viewed from outside

Parameters

The graphs below show the available sash and frame sizes for the Vertical Slide & Tilt range, the leader lines show key dimensions, the shaded areas show the hardware limitations and availability of egress (0.33m²) for compliance with the relevant Building Regulations. The graphs also show the size restrictions of varying glazing options.







We may be able to accommodate windows with taller sashes by making them slide only - please enquire.
Please refer to ventilation page for minimum window parameters to accept trickle ventilators.

Maximum Sized Windows

For Health & Safety and Manual Handling the maximum semi-perimeter (width + height) for any single frame Allan Brothers will make is 4500mm. For larger windows, it is recommended that two windows are site coupled - see coupling diagrams and drawings section pages. Any individual glazed light over 2.5m² will require 6mm toughened 2 sides glazing.

Window Weights

Window weights will be provided on the estimate/order.
Please refer to MAC Tool on HSE website for individual Manual Handling Assessment.

Weather Performance & Operating Forces

Weather Performance

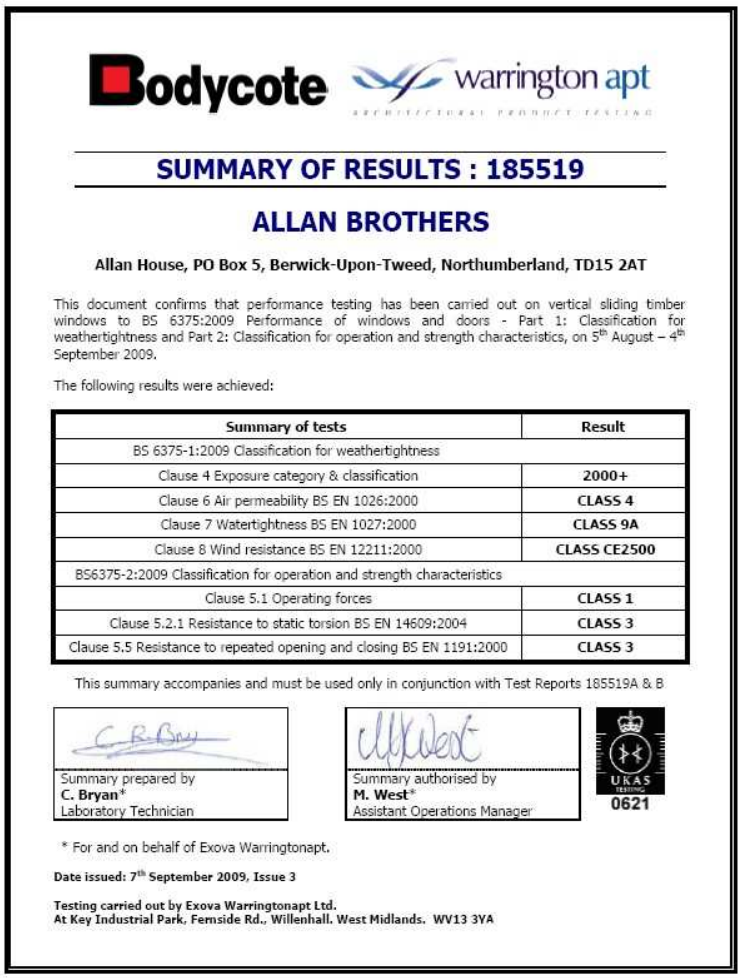
Allan Brothers Vertical Slide & Tilt windows have been fully tested by independent test houses for –

Air Permeability, i.e. - the ability to resist air leakage through the window, under positive and negative pressures, to replicate the effects of variable wind speed and direction.
The sample windows were tested to BS EN 1026 and the results were classified in accordance with BS EN 12207 to Class 4. The test steps up the positive and negative pressure in defined increments from 50Pa to 600Pa.
Typically, BS 6375 Pt1 recommends a class 2 rating (300Pa) for windows. ***The Vertical Slide & Tilt meets Class 4 (600Pa) which is the highest rating under this standard.***

Watertightness, i.e. the ability to resist water penetration when spraying the window and applying pressure in defined increments from 0Pa to 600Pa to the external face of the window to replicate the effects of driving rain.
The sample windows were tested to BS EN 1027 and the results are classified in accordance with BS EN 12208 to Class 9a.
Typically BS 6375 Pt1 recommends a class 3A (100Pa) for most locations rising to class 5A (200Pa) for more severe conditions. ***The Vertical Slide & Tilt window achieved a Class 9a (600Pa)***

Resistance to Wind Load, i.e. the ability of the members to resist deflection under positive and negative static and dynamic wind loads.
The sample windows were tested to BS EN 12211 and the results were classified in accordance with BS EN 12210 to Class E2500.
Typically UK buildings are subject to design wind loads of no more than class 3 (1200Pa). In the most severe weather conditions of the Scottish Highlands and Islands design wind loads can rise above class A5 (2000Pa). ***The Vertical Slide & Tilt achieved performance levels well in excess of these requirements gaining a resistance to wind rating of class CE2500 - the maximum the Test House rig was capable of.***

Operation and Strength Characteristics, i.e. for ease of use of operating the window to disengage, open, close and re-engage.
The sample windows were tested to BS 6375 Pt2 and passed all of the following criteria:- fastener operation, movement of sash, resistance to excessive operating force, release of jammed sash, release of jammed hinge, strength of restricted opening and location devices and maximum opening stops.



Bodycote warrington apt

SUMMARY OF RESULTS : 185519

ALLAN BROTHERS

Allan House, PO Box 5, Berwick-Upon-Tweed, Northumberland, TD15 2AT

This document confirms that performance testing has been carried out on vertical sliding timber windows to BS 6375:2009 Performance of windows and doors - Part 1: Classification for weathertightness and Part 2: Classification for operation and strength characteristics, on 5th August – 4th September 2009.

The following results were achieved:

Summary of tests	Result
BS 6375-1:2009 Classification for weathertightness	
Clause 4 Exposure category & classification	2000+
Clause 6 Air permeability BS EN 1026:2000	CLASS 4
Clause 7 Watertightness BS EN 1027:2000	CLASS 9A
Clause 8 Wind resistance BS EN 12211:2000	CLASS CE2500
BS6375-2:2009 Classification for operation and strength characteristics	
Clause 5.1 Operating forces	CLASS 1
Clause 5.2.1 Resistance to static torsion BS EN 14609:2004	CLASS 3
Clause 5.5 Resistance to repeated opening and closing BS EN 1191:2000	CLASS 3

This summary accompanies and must be used only in conjunction with Test Reports 185519A & B

Summary prepared by
C. Bryan*
Laboratory Technician

Summary authorised by
M. West*
Assistant Operations Manager

UKAS TESTING 0621

* For and on behalf of Exova Warringtonapt.

Date issued: 7th September 2009, Issue 3

Testing carried out by Exova Warringtonapt Ltd.
At Key Industrial Park, Fernside Rd., Willenhall. West Midlands. WV13 3YA

Security Performance

Secured by Design (SBD) is a police initiative that encourages the building industry to adopt a number of crime prevention methods which assist in reducing the opportunity for crime and the fear of crime thus resulting in a safer and more secure environment.
The aim of SBD is to achieve a better quality of life by focusing on crime prevention at the design, layout and construction stages of homes and commercial premises. In doing so Secured by Design supports one of the Government's key planning objectives: the creation of secure, quality places where people wish to live and work.
Secured by Design is owned by the Association of Chief Police Officers (ACPO) and has the backing of the Home Office.

The Secured by Design scheme functions on two levels:

- A licensing scheme for products which meet police preferred specifications.
- An award given to developers who build developments to Secured by Design standards.

Licensing Scheme
To achieve Secured by Design accreditation, manufacturers of doors, windows, locks and certain other products must ensure that their products meet the minimum security standards specified by SBD (BS7950 for Windows, PAS24 for Doors). Once a product has been tested and certified to the relevant standard, the company may apply for SBD membership (a licence fee applies). Once Approved, all member companies benefit from the use of the 'Police Preferred Specification' Secured by Design logo on their approved products.

The Developers Award
The Secured by Design award is a certificate given to developments which, following consultations with local police Architectural Liaison Officers (sometimes called Crime Prevention Design Advisors), are built in a way which conforms to the ACPO guidelines and therefore reduce the opportunity for crime. This encompasses a good use of natural surveillance and defensible spaces as well as windows and doors meeting SBD's minimum quality and security standards. Research carried out by Huddersfield University shows that residents living on Secured by Design Developments are half as likely to be burgled and two and a half times less likely to suffer vehicle crime. Secured by Design developments also benefit from 25% less criminal damage.

Product
When fitted with the requisite ironmongery, our top hung fully reversible and side hung Vertical Slide & Tilt windows have been independently tested to and meets the criteria of BS 7950: 1997 Specification for enhanced security performance. A copy of the test reports and Secured by Design license are shown below. The range is internally glazed with security tape to stop the removal of the double glazing units. In the tests the units are subject to mechanical forces applied to the corners and manual manipulation using an array of hand tools to check the security of the glazing. The samples are also subject to mechanical tests where forces are applied to specific points on the windows and then a series of 3 minute attacks using hand tools.


Secured by Design

Secured by Design Licence Holder

This is to certify that:

Allan Brothers

Of:
Allan House
Ord Road
Berwick Upon Tweed
Northumberland
TD15 2XU

hold a 'Secured by Design' Licence.

Certificate valid for 12 Months from date below and only for products listed on the Licence Holder's schedule

Please refer to www.securedbydesign.com/companies/index.aspx for the current schedule information.

Signed: Date: 20th May 2011

Sir Hugh Orde OBE
Chairman ACPO CPI Ltd

ACPO Secured by Design, 1st Floor, 10 Victoria Street, London SW1H 0NN


BM TRADA CERTIFICATION

Certificate Number
050

REGISTRATION CERTIFICATE

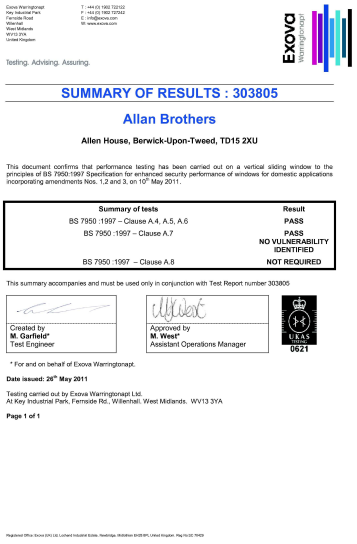
BM TRADA
Q-MARK

This is to certify

Allan Brothers Ltd
Allan House
Ord Road
Tweedmouth
Berwick Upon Tweed
TD15 2XU

Meets the requirements of
The BM TRADA Scheme for
Enhanced Security Windows
BS 7950: 644 Timber

Signed on behalf of BM TRADA Certification Ltd
Dr Peter Beele, Chief Operating Officer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Exova Warringtonapt

Testing. Advising. Assuring.

SUMMARY OF RESULTS : 303805

Allan Brothers

Allen House, Berwick-Upon-Tweed, TD15 2XU

This document confirms that performance testing has been carried out on a vertical sliding window to the principles of BS 7950:1997 Specification for enhanced security performance of windows for domestic applications incorporating amendments Nos. 1,2 and 3, on 10th May 2011.

Summary of tests	Result
BS 7950 :1997 – Clause A.4, A.5, A.6	PASS
BS 7950 :1997 – Clause A.7	PASS NO VULNERABILITY IDENTIFIED
BS 7950 :1997 – Clause A.8	NOT REQUIRED

This summary accompanies and must be used only in conjunction with Test Report number 303805

Created by
M. Garfield*
Test Engineer

Approved by
M. West*
Assistant Operations Manager

UKAS TESTING 0621

* For and on behalf of Exova Warringtonapt.

Date issued: 26th May 2011

Testing carried out by Exova Warringtonapt Ltd.
At Key Industrial Park, Fernside Rd., Willenhall, West Midlands. WV13 3YA

Page 1 of 1

Please ask for a copy of the latest Secured by Design Licence

Thermal Performance

Poorly selected windows are a major source of heat loss in the winter. Energy efficient windows will help to minimise the heating costs and will also increase comfort.
Energy efficient windows may cost more initially but will not only improve comfort but will save energy and money for the life of the window. Over the life of a window, **the cost of heat lost is greater than the purchase cost**. Choosing the most energy efficient window will save money.
An important factor in the energy efficiency of a whole window is the U-value. A window with a low U-value loses less heat than one with a high U-value.

The following factors affect the whole window U-value:
- The type of glazing material.
- The number of glazing layers.
- The size of the cavity between the glazing layers.
- The type of gas in the cavity between the glazing layers.
- The design, material and type of frame and the other components.

Low emissivity (low-e) glass has special surface coatings to reflect heat back in the room. The low-e coatings reflect 40% to 70% of the heat that is normally transmitted through clear glass.
Double or triple-glazed windows have insulating air or gas-filled spaces between each pane. Highly energy efficient windows are manufactured with inert gases (argon or krypton) in the spaces between the panes because these gases transfer less heat than air.
Warm edge spacer bar will reduce heat loss at the edge of the glazing unit.

Allan Brothers Vertical Slide & Tilt window range uses high performance glazing products -

Neutral Low E - Planitherm Total +
Neutral Low E combines an excellent level of thermal efficiency with, as the name suggests a 'neutral' or clear appearance. All neutral low E units are manufactured using a new generation of soft coated glasses, the most commonly used of which is Planitherm Total+ by St Gobain. The U-Value of this product is 1.4, compared to 2.8 for standard clear glazing. With the addition of argon gas, our high performance Low E units offer the best solution when heat retention is the critical factor. With a centre pane U-Value of 1.2, they offer the householder a level of thermal efficiency far beyond that required by current legislation.
Low Iron Glass
Unlike Low E, Low Iron glass does nothing to help retain warmth in a room - what it does do however is contribute to the overall efficiency of the glazing by allowing more heat in. Often used for its noticeably superior clarity alone, Low Iron glass more easily allows radiated heat and light from the sun to enter a room, and in many cases this means the net effect of the glass is to contribute rather than to leak energy from a building. When considering the new Window Energy Ratings scheme, Low Iron glass is guaranteed to improve the performance of any given installation. Popular brand names for the raw glass product include 'Pilkington Optiwhite' and 'St Gobain Diamant'.
Argon and Krypton Gas Filling
The centre pane U-Value is improved by the addition of gas to the cavity, and hence this process offers a straightforward method of boosting the thermal efficiency of any sealed unit. Argon is commonly used and helps soft coated products from 1.4 to 1.2. Krypton gas is similar in effect but significantly outperforms argon in smaller cavities.
Warm Edge Spacer - Swisspacer V - Black Coloured
As the U-Value of a sealed unit is measured as a 'centre pane' value, the addition of warm edge does not improve this measure. However when looking at the window system as a whole, the thermal efficiency is vastly improved when replacing the standard aluminium bar with a low conductivity spacer. The effect is most noticeable perhaps by eliminating condensation around the edge of the glass, but again when looking at Window Energy ratings, warm edge significantly improves the banding of any system.

Below is a table of U-values for the Vertical Slide & Tilt range using the Glass and Glazing Federation's standard size domestic window.

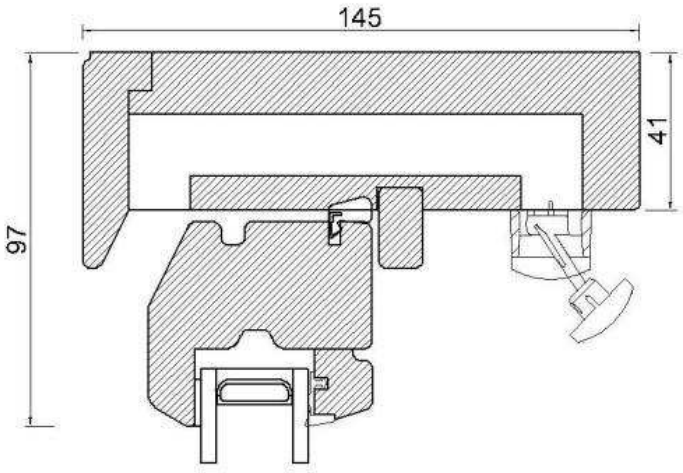
Always ensure that a quoted U-value is for the whole window and not simply for the glass.

Glass Specification	Glass g	U-value	g-value	WER	Band
4-20-4 SGG Planitherm Total+ Air Alum Spacer	0.71	1.74	0.42	-29	D
6.4 Lam-18-4 SGG Planitherm Total+ Argon Alum Spacer	0.65	1.60	0.39	-26	D
4-20-4 Planitherm Total+ Argon Alum Spacer	0.71	1.59	0.42	-19	C
4-20-4 SGG Planitherm Total+ Argon Swiss V	0.71	1.43	0.42	-8	B
6.4 Lam-18-4 SGG Planitherm Total+ Argon Swiss V	0.65	1.44	0.39	-15	C
4-20-4 SGG Planitherm Total+ Argon Swiss V With Diamant Glass	0.74	1.43	0.43	-4	B

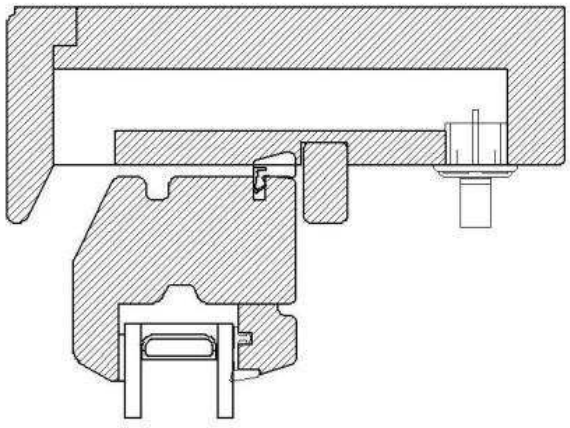
All U-values are taken from simulations carried out using Therm 5.2 by BFRC Approved Simulator 067 - Colin Virtue

Ventilation

Head Sections Showing Ventilation



XS16



TV425HL

Allan Brothers have various ventilation options to enable the specifier to easily achieve the relevant Building Regulations.

XS16

TV425HL

Parameters for trickle vents

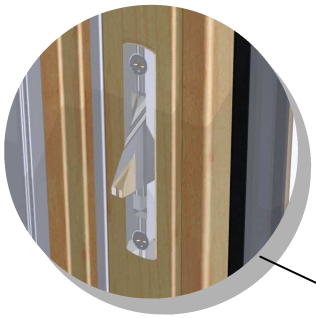
	Frame Size (mm)			
	1 Vent	2 Vent (1 Light)	2 Vent (2 Lights)	Colours
	Min	Min	Min	
XS16	486	875	918	White Brown
Equivalent Area	2900	5800	5800	
Free Area	4000	8000	8000	
TV425 HL	546	934	1038	White Brown Chrome Gold SAA
Equivalent Area	2600	5200	5200	
Free Area	4000	8000	8000	

Fittings

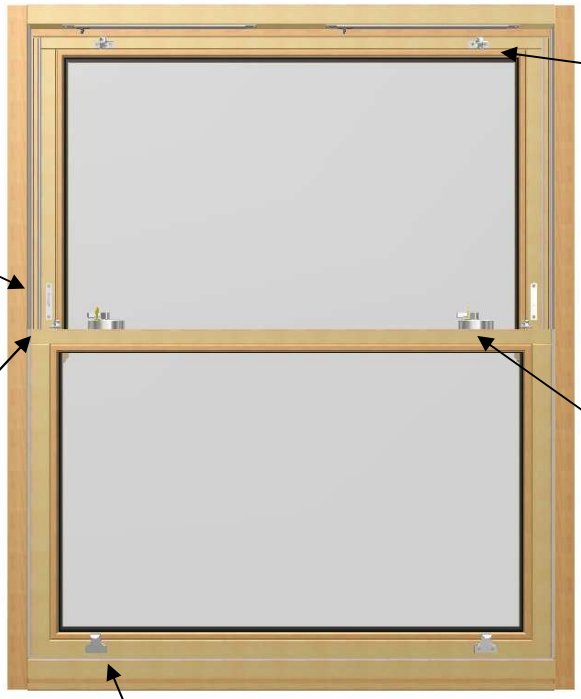
Allan Brothers Vertical Slide and Tilt Windows make use of Caldwell Timb-a-Tilt Hardware .

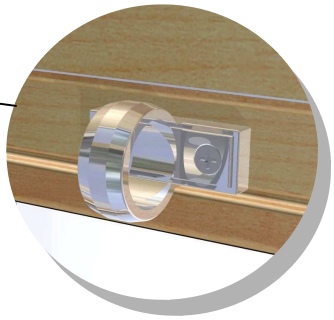
With pre-tensioned Utralift spring balances, the weight of the sash is counter balanced to take any strain when sliding the sashes .

Hardware Parts shown below are available in these colours : Gold, Chrome, White, Brushed Steel

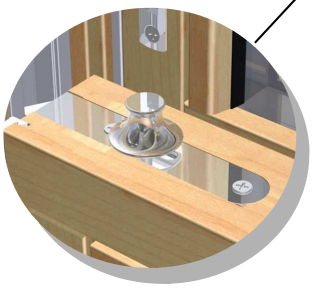


Travel Restrictors

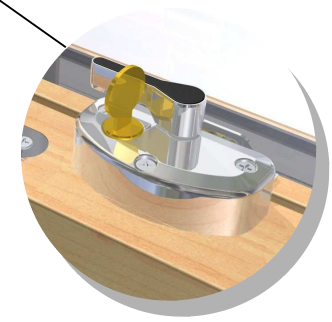




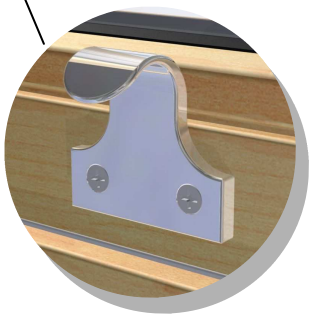
Ring Pulls (Optional)



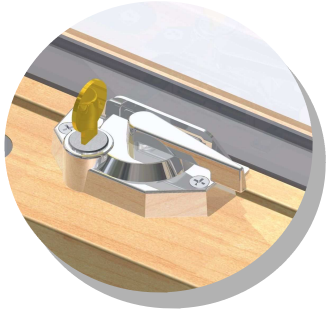
Tilt Latch and cover plate



Security Sash Lock (above) —used on BS7950 windows.
Standard Sash Lock (below)

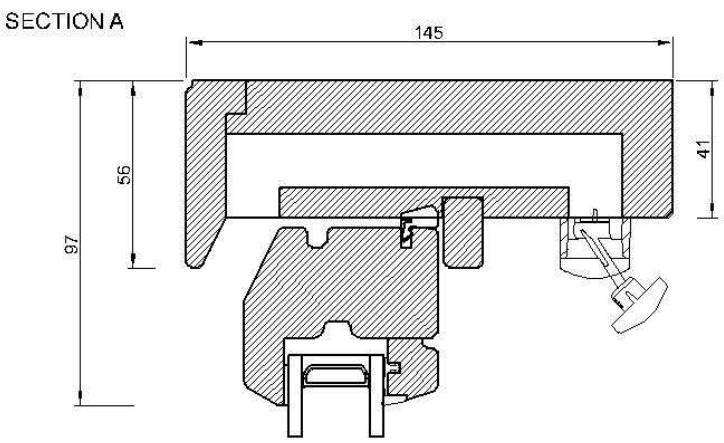


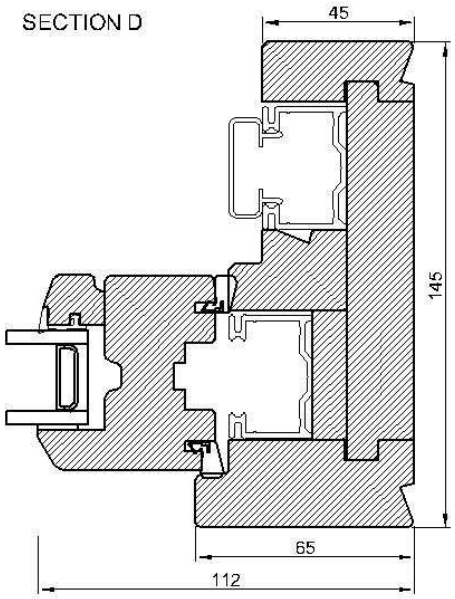
Hook Lifts

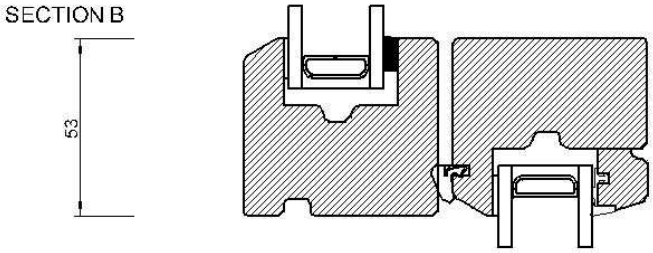


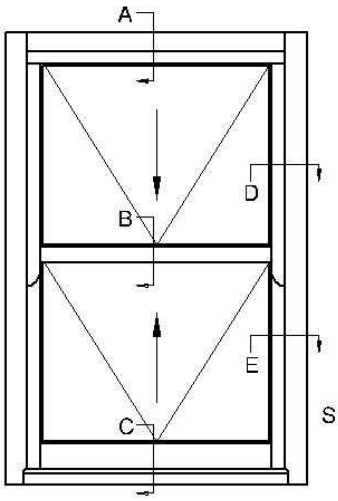
Tilt Restrictors
These are used to allow the sash to be held in the cleaning position. A pair are used on each sash (some companies only fit these to the bottom sash)

Layout Drawing

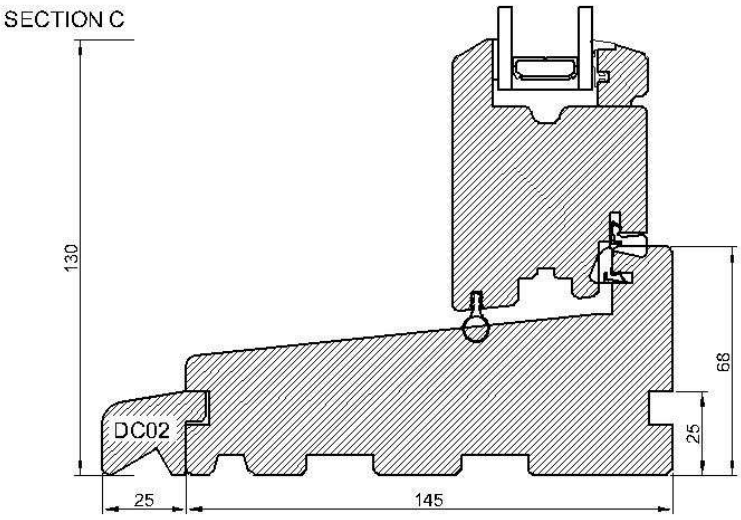


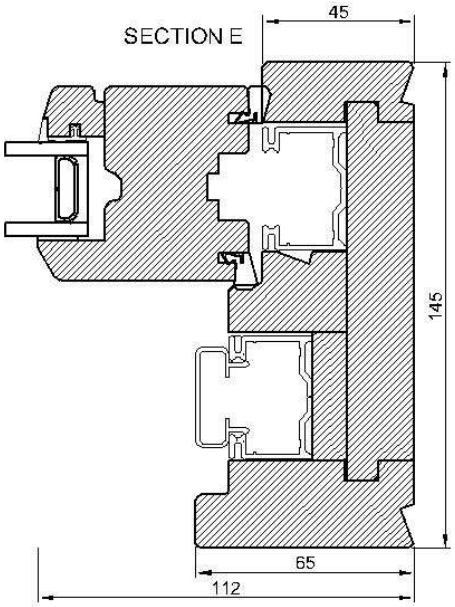


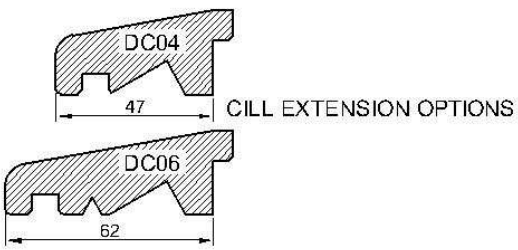




Scale 1:10

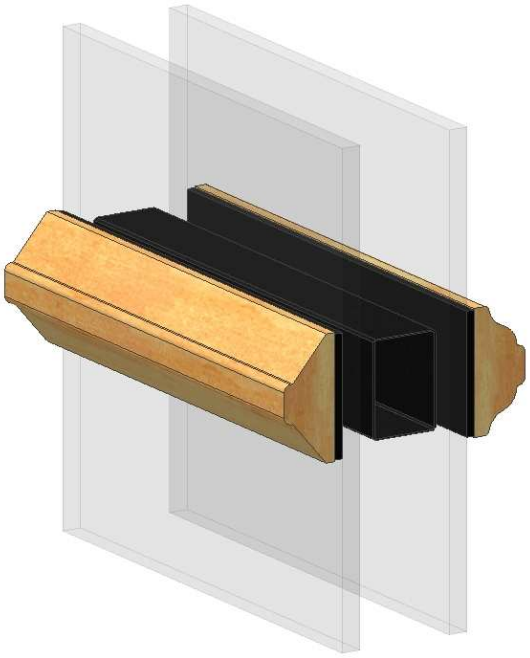


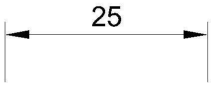


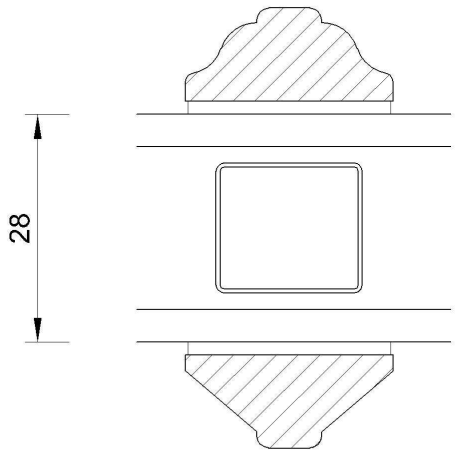


Bars

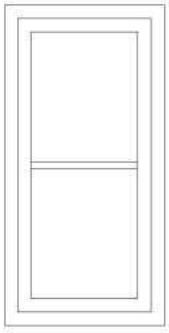
Allan Brothers can match your fenestration requirements with bonded Georgian bars.







Most Common Bar Patterns
Please note other patterns are available on request to suit your fenestration



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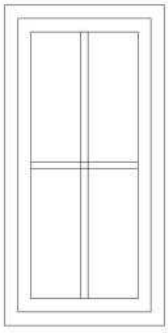
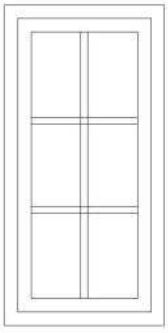
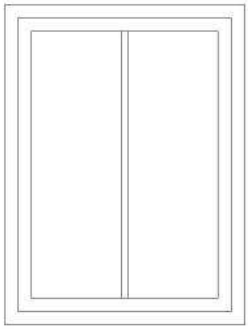


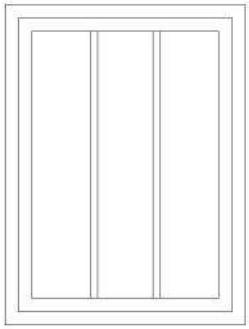
2 x 2



2 x 3



2 x 1



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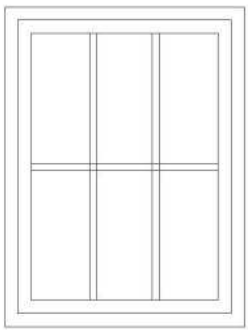

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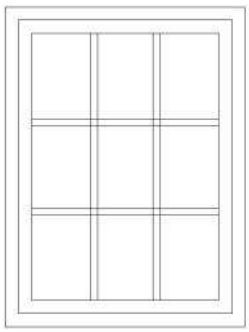


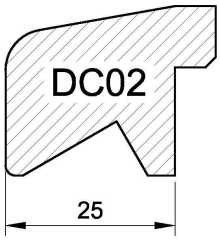
3 x 3

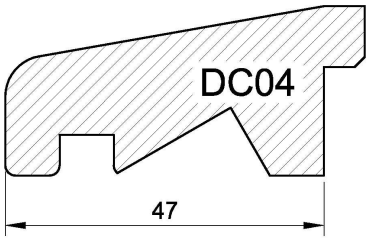
The Georgian bonded bars have an integra bar between the panes, to give the effect of individual glazing units, making them difficult to differentiate from through bars. This also allows the high performing, drained and vented, glazing system to remain intact and do its job without having a detrimental effect on the appearance of the product.

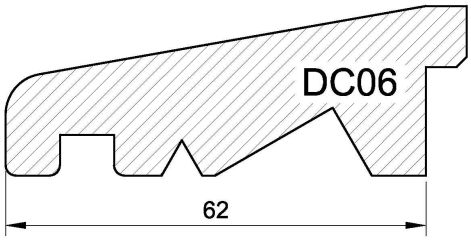
Cill Extensions

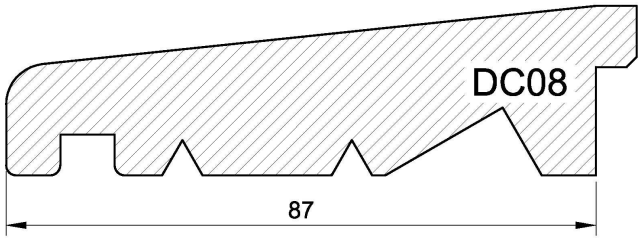
Allan Brothers manufacture a variety of timber cill extensions to suit the built in environment.
The cill extensions are all designed with a large radius edge to ensure good paint coverage.
The underside of the cill extension has rebates to allow concealed fixings and to stop the water travelling back towards the fabric of the building.

Flush Cill









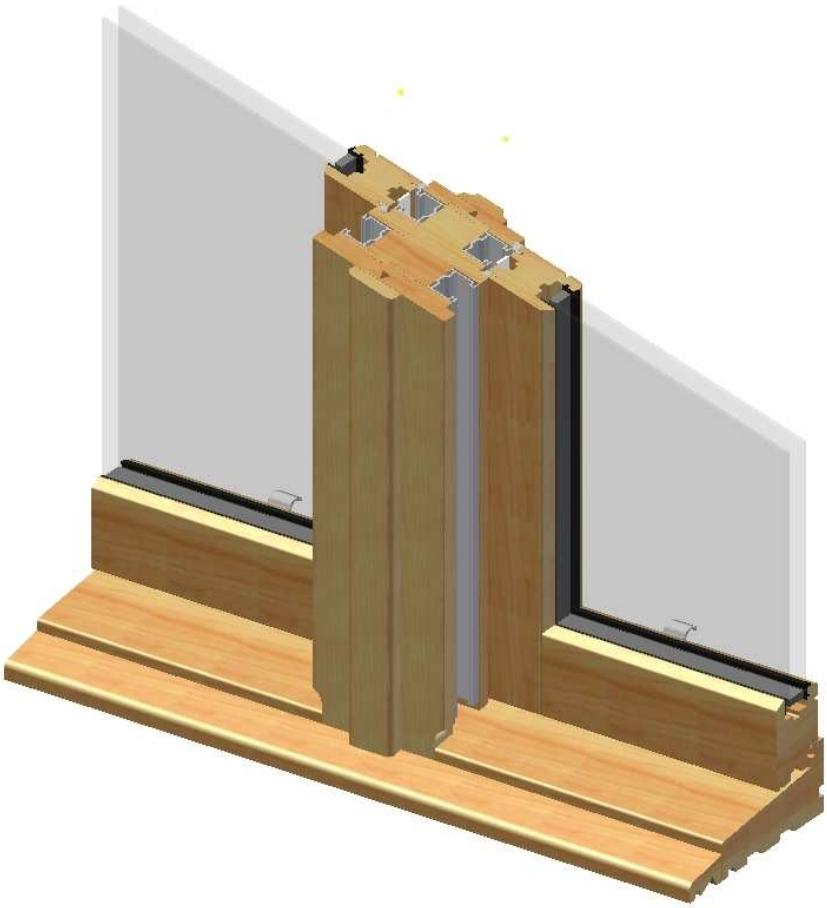
Note: Consideration should be given to cill width when designing a building which incorporates timber windows. Wide cill extensions in timber have a higher chance of failure as coatings need to adapt with the timber to seasonal changes, they will expand and contract more, leaving the coating vulnerable to breakdown over time which can lead to the timber being exposed to moisture. Designing a building with a cill extension of less than 100mm will greatly improve the life of the cill extension.

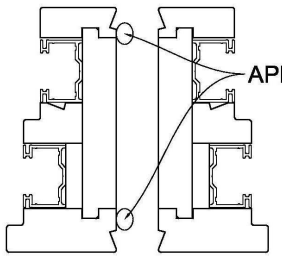
Coupling Diagrams

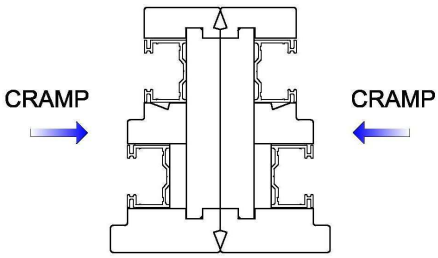
Allan Brothers can supply coupling packs to complement the Vertical Slide & Tilt range.
The Cill Extension section can be supplied long for site fitting across the width of the coupled windows.
Bay Corner Posts can be supplied to various angles to suit your design (in increments of 5°).

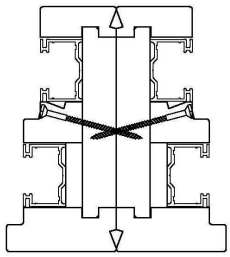
When coupling items please follow the diagrams on the right side of the page

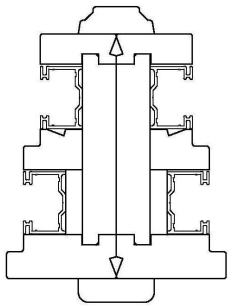
Note: Allan Brothers do not supply load bearing windows.











Operation and Maintenance

Vertical Slide & Tilt Window - User Instructions

In the closed position your Vertical Slide & Tilt window should be kept locked and the key kept in a safe, but handy place.

To operate:

- Open the lock (as shown in Figure 1) by rotating the lever
- Lift the sash upwards.
- At 50mm the safety restrictor will engage (if fitted). The window is now in its initial restricted ventilation position. (as shown in Figure 2)
- For additional ventilation, press the bottom of the restrictor catch in and using the key provided, lock into the disengaged position. Both sashes can now be full opened.
- This is the normal operation of this window, which can be closed by reversing the previous steps

Figure 1

Cleaning -

When in the fully open position, the two sashes can be tilted inwards to enable cleaning

- By disengaging the tilt latches (shown in figure 3) the sashes can be lowered onto the tilt restriction devices. WARNING - these sashes can be heavy and you may require help to tilt the sashes and return them to the normal operating position.
- When returning the sashes to the normal operating position (the vertical plane), remember to **hold in the tilt latches** to avoid damage to the frame.

Figure 2

Figure 3

Closed

Restricted

Lower Ventilation

Purge Ventilation

Lower Cleaning

Upper Cleaning

Ventilation -

- If a ventilator is fitted, it can be opened by sliding the faceplate to the left, varying the opening will vary the amount of airflow.

Vertical Slide & Tilt Window - Maintenance

If properly installed, the only required maintenance should be to:

- Ensure guide channels are clean and grit free after installation and thereafter twice a year.
- Clean the coating and glass (minimum twice yearly) using mild detergent and clean warm water, applied with a soft cloth or brush. Do not use any other chemicals.
- The spring balances are self lubricating but need to be used to enable this, therefore fully sliding the sashes up and down a few times a year will prolong the life of the balance.

Coatings Information

If your Allan Brothers joinery products have been fully factory finished and installed correctly they should be virtually maintenance free. General cleaning should be carried out regularly (minimum twice a year) using a non-abrasive cloth with mild detergent and warm water (ph neutral solution) to remove any contaminates, whilst frequently changing the water. **Under no circumstances should aggressive, alkaline or acidic cleaners be used.** After cleaning rinse thoroughly with clean water to remove all residues, but do not use hosepipes. During cleaning, if any damage is noticed then this must be repaired immediately as below.

Repair of Coatings

Should damage occur the damaged surface must be cleaned of any loose timber, paint or stain. If filler is required then flexible two-pack filler should be used. The area should then be recoated with the appropriate paint or stain colour.

Subsequent Painting / Redecoration

Under normal environmental conditions, your fully finished coating will last for 5 years' (stain) or 8 years' (opaque) before it needs to be re-coated. This may vary with location, exposure, elevation, etc. When re-coating simply clean the timber frame and redecorate using a high build micro-porous (MVP) finish. (For full info, see General Technical Info—Coatings Maintenance Guidelines)

Specifiers Guide

Getting the Vertical Slide & Tilt Specified
Our Vertical Slide & Tilt range can be specified as the window standard on a project by using this general specification which can be altered to suit the user's needs.

- **Timber Windows**
  High performance sliding sash window frame replacement, factory double-glazed and factory finished.

- **Manufacturer and reference:**
  Allan Brothers Ltd. Allan House, Ord Road, Tweedmouth, Berwick-upon-Tweed, TD15 2XU
  Tel 01289 334600, Fax 01289 334601, Website: www.allanbrothers.co.uk, E-mail: abinfo@allanbrothers.co.uk
  Reference - Allan Brothers Vertical Slide & Tilt

- **Materials generally:**
  To BS EN 942. Timber species: European redwood from selected sawmills, timber sources from sustainable managed forests with a minimum of 70% FSC material
  Class J10 for glazing beads and the like.
  Class J30 or better for all other members.

- **Preservative treatment:**
  Organic solvent as NBS section Z12 Table 25 of the British Wood Preserving and Damp-proofing Association manual 1999 or equivalent.
  Desired service life: 30 years.
  Moisture content on delivery: 13 - 19%.

- **Manufacture:**
  Accredited to BS 644, Part 1 and fully weather-stripped.
  Constructed in accordance with BS 1186-2.
  Adhesive to BS EN 204, Part 1, Group D4.
  Exposure category - BS6375, Part 1. - Design wind pressure: minimum 2500 (Pa).

- **Security generally:**
  To 'Secured by Design' standards
  Windows to be Q-mark accredited to BS 7950 specification for enhanced security performance of windows for domestic applications.
  Manufactured by a firm currently holding a 'Secured by Design' Licence

- **Glazing:**
  Factory glazed to meet current thermal regulations with 28mm double-glazed units, manufactured and kitemarked to BS EN1279 and factory fixed in accordance with BS6262. Dry glazed system with double-sided security tape and aluminium drained and ventilated bottom bead. Where required, laminated glass to meet SBD

- **Finish as delivered:**
  Fully factory finished. Water-borne decorative paint or stain finish (colour to be chosen by client). Total dry coating minimum 120 microns. All decorative finishes to have a minimum warranty of 10 years for opaque and 10 years for stain in conjunction with the supplier's recommended maintenance procedure

- **Ironmongery/accessories:**
  To 'Secure by Design' standards
  All ironmongery to have a minimum 10 year warranty
  Hardware: Caldwell Timbatilt - Vertical sliding sashes with tilting facility for cleaning that have met the requirements of BS7950 at a UKAS testing house.
  Trickle Ventilation: Ventilators to be fitted as standard to head of frames to meet statutory requirements.

- **Warranties** 30 years against rot and fungal attack
  10 years against glazing unit failure
  10 years against manufacturing defects
  10 years on all ironmongery
  10 years on opaque finished
  10 years on stain finish coatings